REMARKS

Claims 1-19 are pending. Claims 9-18 are withdrawn, leaving claims 1-8 and 19 active.

Independent claim 1 is proposed to be amended to include the subject matter of claim 2. Independent claim 19 is proposed to be amended in the same manner.

Claims 1-8 are rejected over the combination of the newly cited reference to Dickinson, et al., U.S. 5,685,153 in view of Doi, JP 2002-059118.

The object of the present invention is to produce an upgraded biomass which is easy to handle and has a heating value adequate to serve as an alternative fuel to heavy oil or coal. In order to achieve this object, Claim 1 of the present application includes the following features:

(1) an upgrading step for performing upgrading treatment of a cellulose based biomass with an oxygen/carbon atomic ratio of at least 0.5, in presence of water, under a pressure of at least saturated water vapor pressure, and at a temperature of 250 to 350° C., for a period of 5 to 120 minutes, and

(2) reducing said oxygen/carbon atomic ratio of said biomass from 0.216 to 0.38,

(3) a separation step for separating an upgraded reactant obtained from said upgrading step into a solid component and a liquid component, and

(4) recovering said solid component which is an upgraded biomass with said oxygen/carbon atomic ratio of 0.216 to 0.38 whose recovered weight is at least 40 % of the weight of said cellulose based biomass.

A major feature of claim 1 is that the oxygen/carbon atomic ratio of the upgraded biomass is 0.216 to 0.38. Thus, the upgrading process of Claim 1 selects a mild condition to achieve an upgraded reactant with an oxygen/carbon atomic ratio of 0.216 to 0.38. As set forth in the above feature (1), the condition of the upgrading treatment of Claim 1 is restricted to being in the presence of water, under a pressure of at least saturated water vapor pressure, and at a temperature of 250 to 350° C., for a period of 5 to 120 minutes.

In addition, Claim 1 sets forth the solid component is separated and dewatered by the separation process. By including the above separating process, as shown in the above feature (4),

the novel process of Claim 1 can obtain a dewatered solid component as an upgraded biomass at a high recovery rate which is at least 40 % of the weight of the cellulose based biomass (See specification, page 15, lines 1 to 4).

On the other hand, Dickinson discloses a method for upgrading carbonaceous waste to high energy density slurry fuels. In particular, Dickinson discloses that particles in a feed slurry are broken up into smaller particles of char, and a slurry of high concentration whose reology is dramatically improved is obtained. Thus, the characteristic of Dickinson involves heating the feed slurry under pressure to a temperature at which a significant physical and molecular rearrangement occurs which includes the splitting off of a substantial proportion of the oxygen bound in the carbonaceous waste as carbon dioxide (column 5, lines 14 to 31).

Dickinson neither teaches nor suggests selecting conditions to achieve an upgraded reactant with an oxygen/carbon atomic ratio of 0.216 to 0.38. Therefore, Dickinson neither teaches nor suggests use of a particular treatment temperature, a treatment pressure and/or a treatment time as is specifically set forth in Claim 1. In addition, Dickinson does not disclose the treatment time.

Dickinson discloses that "the viscosity restraint is 49 % or more" (column 4, lines 53 to 56). This means that "the weight percentage of solid fuel particles in the slurry is 49 % or more". Thus, the viscosity restraint of Dickinson does not show the recovery rate of a solid component (upgraded biomass) to the weight of the cellulose based biomass. Therefore, Dickinson does not disclose the above characteristic (4) of the present invention as set forth in claim 1.

Therefore, the object, technical features, and the advantageous effects of Claim 1 of the present application are quite different from and are not obtained by Dickinson.

Doi has an object to provide a method to obtain saccharides and fuel gas by thermal decomposition of plant biomass, and a system to accomplish this. In Doi, plant biomass is hydrolyzed without using a catalyst in hot-compressed water at 140-230°C under a pressure higher than the saturated vapor pressure, and hemicellulose is extracted. Next, the remaining cellulose is cracked at 320-360°C in the presence of a nickel catalyst to produce a fuel gas including hydrogen gas.

However, the first stage disclosed in Doi is extracting hemicellulose from biomass. The processing temperature is 140-230°C which is lower than that used in the upgrading treatment step

of Claim 1 of the present application. The second stage disclosed in Doi is producing fuel gas from cellulose, and a nickel catalyst is used. The novel method set forth in Claim 1 does not use catalysts. Also, Doi does not disclose that the oxygen/carbon atomic ratio of the upgraded biomass is 0.216 to 0.38. Furthermore, Doi does not disclose or suggest the recovery rate of a solid component (upgraded biomass) to the weight of the cellulose based biomass. Thus, Doi does not disclose the above feature (4) of the present invention.

Therefore, the object, technical features, and the advantageous effects of Claim 1 of the present application are different from Doi.

The Examiner makes the combination of Dickinson and Doi . However, as described above, the processing condition of Doi is different from that set froth in Claim 1. In addition, both Dickinson and Doi do not disclose that the oxygen/carbon atomic ratio of the upgraded biomass is 0.216 to 0.38. nor that the recovered solid component weight is at least 40 % of the weight of the cellulose based biomass. Therefore, even if the processing condition of Doi is combined with Dickinson, the upgraded biomass with the oxygen/carbon atomic ratio of 0.216 to 0.38 whose recovered weight is at least 40 % of the weight of the cellulose based biomass are not obtained.

The object, technical features, and the advantageous effects of Claim 1 of the present application are different from the method taught by the combination of Dickinson and Doi. There is no mention or suggestion of the object, technical features and the advantageous effects of the novel method of Claim 1 either in Dickinson or Doi alone or in the combination of the references. Claim 1 defines a novel invention over Dickinson and Doi and the claim should be allowed.

Claims 3-8 depend director or indirectly on Claim 1 and recite further novel features of the invention. Therefore, these dependent claims also are patentable over Dickinson and Doi and should be allowed.

Claim 19 is rejected over the combination of Dickinson and Doi and further in view of White, U.S. 3,698,881. White is cited for its teaching of a method of gasifying gaseous hydrocarbons to produce synthesis gas comprising hydrogen and carbon monoxide.

Claim 19 includes the upgrading step of claim 1. Basically, the invention recited in claim 19 discloses that the method of producing an upgraded biomass gas in presence of a gasifying agent by subjecting the upgraded biomass obtained by the invention recited in claim 1.

On the other hand, White discloses a method of gasifying to produce synthesis gas comprising hydrogen and carbon monoxide from sewage (column 2, lines 7-55).

The Examiner makes the combination of the gasification method disclosed in White and the reaction products of Dickinson and Doi. However, as demonstrated above, the method of the upgrading a biomass of claim 1 is quite different from the method of Dickinson and Doi. Also, the invention recited in claim 19 further includes a gasification treatment and the totality of the claimed subject matter is different from and patentable over the combination of Dickinson,, Doi and White.

There is no teaching or suggestion of the object, technical features and the advantageous effects of claim 19 in Dickinson, Doi and White. Claim 19 defines invention over the combination of Dickinson, Doi and White. Therefore, this claim is patentable and should be allowed.

The amendment should be entered since it clearly places the application in condition for allowance. It does not raise any new issue since only the features of one original claim (claim 2) is combined into each of the independent claims.

If the amendment is not entered as placing the application in condition for allowance, then its entry is requested for purposes of appeal.

Prompt and favorable action is requested.

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